

FCC MAIL SECTION

JUN 23 1 30 PM '95
Before the
Federal Communications Commission
Washington, D.C. 20554

DISPATCHED BY

WT Docket No. 95-70

In the Matter of

Amendment of Parts 22, 90, and 94 RM-8200
of the Commission's Rules to Permit
Routine Use of Signal Boosters

NOTICE OF PROPOSED RULE MAKING

Adopted: May 17, 1995;

Released: June 22, 1995

Comment Date: July 14, 1995

Reply Comment Date: August 1, 1995

By the Commission:

I. INTRODUCTION

1. The Commission has received a Petition for Rule Making (Petition) from TX RX Systems, Inc. (TX RX) requesting that Parts 22, 90, and 94 of the Rules and Regulations be amended to permit routine use of one-way or two-way signal boosters.¹ Comments supporting the petition were received from five parties.² This *Notice of Proposed Rule Making (Notice)* proposes to permit licensees to routinely use signal boosters in Part 22 common carrier paging operations, Part 90 land mobile radio and paging operations, and Part 94 multiple address system operations.

II. BACKGROUND

2. A signal booster is a device that receives an incoming signal, amplifies it, and retransmits it on the same frequency. It is used to improve communications in locations within the normal coverage area of a radio system where the signal is blocked or shielded due to natural terrain or man-made obstacles (e.g. to provide fill-in coverage but not increase the normal coverage area). For instance, signal boosters may be used to fill in "dead spots" in locations such as valleys, tunnels, below-ground parking facilities, or inside cargo vessels and aircraft hangers. Signal boosters may be designed for either one-way or two-way operation.³

3. There are two general types of signal boosters, narrowband boosters and broadband boosters. A narrowband booster is designed to amplify only those discrete frequencies intended to be transmitted.⁴ A broadband booster amplifies all frequencies that are received within the booster's passband.⁵ The passband of a signal booster may range from 50 kilohertz to 20 megahertz, but is typically between 2 and 10 megahertz.

4. Currently, under Part 90 Private Land Mobile Radio Services rules, signal boosters may be used only on ten Business Radio Service frequency pairs in the 450-470 MHz band for communications related to the servicing and supplying of aircraft at certain specified airports.⁶ Under Part 22 Public Mobile Service rules, a form of signal booster, generally called a cellular repeater, may be employed by cellular licensees without separate licensing provided that the repeater does not extend the licensee's signal beyond the authorized cellular service area.⁷

III. DISCUSSION

5. Signal boosters have proven to be a viable and practical way to resolve signal coverage problems caused by natural or man-made obstacles thereby allowing licensees to make maximum use of radio systems. Further, the comments unanimously supported expanding the use of signal boosters. Therefore, we propose to expand the use of signal boosters to Part 22 common carrier paging operations at 931-932 MHz, to Part 90 land mobile radio operations in all Part 90 frequency bands above 150 MHz, to Part 90 paging operations at 929-930 MHz, and to Part 94 multiple address system operations in the 928-960 MHz band.

6. We propose to define a signal booster as a device that automatically receives, amplifies, and retransmits on a one-way or two-way basis, the signals received from base stations, mobile, and portable units, with no change in frequency or authorized bandwidth. We propose to classify boosters as either narrowband (Class A), in which case the booster amplifies only those discrete frequencies intended to be retransmitted, or broadband (Class B), where all signals within the passband of the signal booster filter are amplified. We further propose that licensees may employ either Class A or Class B signal boosters as required, be responsible for eliminating any harmful interference that the signal booster may cause to other licensees, and for ensuring that the basic authorized coverage area is not expanded.⁸

7. In its comments on the Petition, ATG suggests that boosters be required to employ a directional antenna to decrease the possibility of undesired co-channel base station transmissions being received and retransmitted, and to reduce the risk of interference by the booster to other co-channel or adjacent channel base stations.⁹ We are not

¹ Petition for Rule Making, RM-8200, filed on February 25, 1993.

² Comments were received from Allen Telecomm Group (ATG), Celwave (Celwave), The Jack Daniel Company (Daniel), Motorola, Inc. (Motorola), and the Utilities Telecommunications Council (UTC). Reply comments were filed by TX RX.

³ Two-way signal boosters operate in the full duplex mode with different frequencies transmitted in each direction.

⁴ In a narrowband booster, although the output frequencies are the same as the input frequencies, the incoming frequencies intended to be retransmitted undergo a frequency conversion within the booster. This frequency conversion technique enables

the booster to amplify only desired frequencies.

⁵ Broadband boosters are suited for use in tunnels and other confined areas where the possibility of adjacent frequency signals being received by the booster is unlikely.

⁶ See 47 C.F.R. § 90.75(c)(25). We have also granted waivers to allow other Part 90 licensees to use signal boosters.

⁷ See 47 C.F.R. § 22.165.

⁸ Reception of co-channel transmissions on shared frequencies in the same geographic area will not be considered as interference.

⁹ Comments of ATG at 3.

convinced that the use of directional antennas should be mandated. We believe there are many systems in which an omnidirectional booster antenna would be preferable. As previously mentioned, we propose to make licensees responsible for correcting any interference caused by the use of boosters and one method may be to use a directional antenna in a specific application, but this does not mean that all systems should be required to use directional antennas. We tentatively conclude that antenna selection should be left to the licensee, and request comment on this conclusion.

8. We propose to limit the total output power of a booster to 500 milliwatts (mw). The output power of broadband (Class B) boosters would be determined by dividing the total available booster power by the number of authorized frequencies (channels) that the booster is retransmitting. Considering that there would most likely be some gain in a typical booster antenna, the proposed 500 mw transmitter power level will approximate the transmitted effective radiated power of most hand-held portable units. We believe that this booster power level should be adequate for the intended purpose while still being sufficiently restrictive to guard against interference to other users.¹⁰ To limit potential interference from any spurious emissions generated by the booster, we propose that all signal boosters must meet the out-of-band emission requirements currently specified in the rules.¹¹

9. In the Petition and comments, suggestions were made concerning the use of signal boosters that translate the incoming frequency to a different outgoing frequency. The petitioner states that it recognizes that there are unique situations, such as systems requiring coverage below ground, where a booster/translator would be required to translate an incoming signal to a different frequency.¹² ATG suggests that this proceeding be expanded to incorporate the use of booster/translators.¹³ Motorola recommends that a licensee be permitted to use a booster/translator if it has exclusive use in its area of operation of the input and output frequencies utilized in the booster.¹⁴

10. By definition, a signal booster is a device that retransmits a signal with no change in frequency or authorized bandwidth.¹⁵ A booster is intended to fill in weak or no-signal areas that may be present in a licensee's area of operation. A booster/translator, however, requires different input and output frequencies and is functionally the same as a mobile relay or repeater station, although operating at a lower power level. The comments concerning the use of booster/translators indicate that such devices could be used to extend a licensee's coverage area. We are concerned that booster/translators could be used to extend the coverage area and thereby increase the potential for interference. We decline to propose authorizing the use of booster/translators to extend service area coverage, but request comment on authorizing their use to provide better coverage within a licensee's existing service area. In par-

ticular, we request comment on the types of situations in which a booster/translator would be superior to a booster for this purpose.

11. The petitioner requests that licensees seeking to employ signal boosters to penetrate structures or other obstacles within the area customarily served by the licensee's system not be required to obtain specific authorization to utilize the signal boosters, provided that the signal boosters have been type accepted by the Commission. The petitioner suggests that the authority for licensees to use signal boosters be similar to the provisions governing operation of speed radar units in the Part 90 Public Safety Radio Services.¹⁶ Motorola comments that the use of boosters should be reflected on the station authorization either by the addition of a letter to the station class as is now done with Part 90 interconnected systems, or by a provision on the license stating that the system uses boosters in accordance with the applicable rule section. This would allow identification of the licensee in the unlikely event an interference problem arises.¹⁷ UTC suggests that a licensee obtain blanket authority to operate signal boosters generally and provide the Commission and the applicable frequency coordinator specific information on Class A booster deployment.¹⁸

12. The installation and operation of a signal booster would be on frequencies already authorized to a licensee in a specific geographic area. Further, because the booster will not extend a station's coverage area, there should be little chance for interference to distant co-channel users. Thus, there appears to be little justification for creating additional burdens for the licensee or the Commission by requiring a licensee to obtain separate authorization for the operation of a signal booster. Therefore, we are proposing to allow eligible Part 22, 90, and 94 licensees to operate signal boosters without separate authorization from the Commission. Licensees will be required to use type accepted equipment and to ensure that all applicable rule requirements are met.

IV. PROCEDURAL MATTERS

Regulatory Flexibility Act.

13. We certify that the Regulatory Flexibility Act of 1980 does not apply to this rule making proceeding because, if the proposed rule amendments are promulgated, there will not be a significant economic impact on a substantial number of small business entities, as defined by Section 601(3) of the Regulatory Flexibility Act. The Secretary shall send a copy of this Notice, including the certification, to the Chief Counsel for Advocacy of the Small Business Administration in accordance with paragraph 605(b) of the Regulatory Flexibility Act, Pub. L. No. 96-354, 94 Stat. 1164, 5 U.S.C. §§ 601-612 (1981).

¹⁰ The power output is the same as for boosters currently authorized in the 450 MHz band. See 47 C.F.R. § 90.75(c)(25)(ii).

¹¹ See 47 C.F.R. §§ 22.106, 90.209, and 94.71.

¹² TX RX suggests that such booster/translators be licensed as repeaters. Petition at n.17.

¹³ ATG states that booster/translators would satisfy the needs of SMRs and other licensees in rural areas to extend coverage areas at minimal cost. Comments of ATG at 3.

¹⁴ Comments of Motorola at 3.

¹⁵ See 47 C.F.R. § 90.7.

¹⁶ Rule sections 47 C.F.R. §§ 90.17(e)(4), 90.19(g)(6), 90.21(e)(4), 90.23(e)(3), and 90.25(e)(3) permit licensees to operate type accepted speed radar units under their base/mobile station license. A specific authorization from the Commission is not required.

¹⁷ Comments of Motorola at 3.

¹⁸ Comments of UTC at 6.

Ex Parte Rules - Non-Restricted Proceeding.

14. This is a non-restricted notice and comment rule making proceeding. *Ex Parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in Commission rules. See generally 47 C.F.R. §§ 1.1202, 1.1203, and 1.1206(a).

Comment Dates.

15. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments on or before **July 14, 1995**, and reply comments on or before **August 1, 1995**. To file formally in this proceeding, you must file an original and four copies of all comments, reply comments, and supporting comments. If you want each Commissioner to receive a personal copy of your comments, you must file an original plus nine copies. You should send comments and reply comments to Office of the Secretary, Federal Communications Commission, Washington, DC 20554. Comments and reply comments will be available for public inspection during regular business hours in the F.C.C. Reference Center of the Federal Communications Commission, Room 239, 1919 M Street, N.W., Washington, DC 20554.

Authority.

16. Authority for issuance of this *Notice of Proposed Rule Making* is contained in Sections 4(i) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i) and 303(r).

17. For further information concerning this proceeding, contact Eugene Thomson, Wireless Telecommunications Bureau, (202) 418-0634.

FEDERAL COMMUNICATIONS COMMISSION

William F. Caton
Acting Secretary

APPENDIX

Parts 22, 90, and 94 of Chapter I of Title 47 of the Code of Federal Regulations are proposed to be amended as follows:

PART 22 - PUBLIC MOBILE SERVICE

1. The authority citation for Part 22 continues to read as follows:

Authority: 47 U.S.C. 154, 303, unless otherwise noted.

2. Section 22.99 is amended by adding the definition for "signal booster" in alphabetical order to read as follows:

§ 22.99 Definitions.

* * * * *

Signal booster. A stationary device that automatically reradiates signals from base transmitters without channel translation, for the purpose of providing service in weak signal areas.

* * * * *

3. Section 22.377 is amended by revising the first sentence of the introductory text to read as follows:

§ 22.377 Type-acceptance of transmitters.

Except as provided in paragraph (b) of this section, transmitters used in the Public Mobile Services, including those used with signal boosters, in-building radiation systems and cellular repeaters must be type-accepted for use in the radio services regulated under this part. * * *

* * * * *

4. A new Section 22.385 is added to read as follows:

§ 22.385 Signal boosters.

Licensees may install and operate signal boosters without applying for authorization or notifying the Commission, subject to the requirements of this section.

(a) The location of each signal booster must be within the protected service area of the licensee's authorized base transmitter(s) on the channel being reradiated.

(b) Any signal booster used must be designed such that the transmitter output power cannot exceed 500 milliwatts under any normal operating condition.

(c) Licensees must not allow any signal booster that they install and operate to cause interference to the service or operation of any other authorized stations and systems.

PART 90 - PRIVATE LAND MOBILE RADIO SERVICES

1. The authority citation for Part 90 continues to read as follows:

Authority: Sections 4, 303, and 332, 48 Stat. 1066, 1082, as amended: 47 U.S.C. 154, 303, and 332, unless otherwise noted.

2. Section 90.7 is amended by revising the definition for "signal booster" to read as follows:

§ 90.7 Definitions.

Signal booster. A device which automatically receives, amplifies, and retransmits on a one-way or two-way basis, the signals received from base, fixed, mobile, and portable stations, with no change in frequency or authorized bandwidth. A signal booster may be either narrowband (Class A), in which case the booster amplifies only those discrete frequencies intended to be retransmitted, or broadband (Class B), in which case all signals within the passband of the signal booster filter are amplified.

3. Section 90.75(c)(25) is amended by revising the introductory paragraph and paragraphs (i) through (iii), removing paragraphs (iv), (v), (vi), and (vii), and redesignating paragraph (viii) as (iv), to read as follows:

§ 90.75 Business Radio Service.

(c) ***

(25) This frequency is available for assignment as follows:

(i) To persons furnishing commercial air transportation service or, pursuant to § 90.179, to an entity furnishing radio communications service to persons so engaged, for stations located on or near the airports listed in paragraph (c)(25)(iv) of this section. Stations will be authorized on a primary basis and may be used only in connection with the servicing and supplying of aircraft.

(ii) To stations in the Business Radio Service for secondary use at locations 80 km (50 mi) or more from the coordinates of the listed airports at a maximum ERP of 300 watts.

(iii) To stations in the Business Radio Service for secondary use at locations 16 km (10 mi) or more from the coordinates of the listed airports at a maximum transmitter output power of 2 watts. Use of the frequency is restricted to the confines of an industrial complex or manufacturing yard area. Stations licensed prior to April 17, 1986 may continue to operate with facilities authorized as of that date.

4. A new Section 90.219 is added to read as follows:

§ 90.219 Use of signal boosters.

Licenses authorized to operate radio systems in the frequency bands above 150 MHz may employ signal boosters in accordance with the following criteria:

(a) The amplified signal is retransmitted only on the exact frequency(ies) of the originating base, fixed, mobile, or portable station(s). The booster will fill in only weak signal areas and cannot extend the system's signal coverage area.

(b) The booster must be equipped with automatic gain control circuitry which will limit the total output power of the unit to a maximum of 500 milliwatts under all conditions. Per channel output power on broadband (Class B) units is the total output power (500 mw) divided by the number of channels amplified. All equipment must meet the out-of-band emission limits of § 90.209.

(c) Boosters must be installed with sufficient isolation between receiving and retransmitting circuits to prevent oscillation.

(d) The licensee is given authority to operate signal boosters without separate authorization from the Commission. Type-accepted equipment must be employed and the licensee must ensure that all applicable rule requirements are met.

(e) Licensees employing Class B signal boosters as defined in § 90.7 are responsible for correcting any harmful interference that the equipment may cause to other systems.

PART 94 - PRIVATE OPERATIONAL-FIXED MICRO-WAVE SERVICE

1. The authority citation for Part 94 continues to read as follows:

Authority: Secs. 4, 303, 48 Stat., as amended, 1066, 1082; 47 U.S.C. 154, 303, unless otherwise noted.

2. Section 94.3 is amended by adding the definition for "signal booster" in alphabetical order to read as follows:

§ 94.3 Definitions.

Signal booster. A device which automatically receives, amplifies, and retransmits on a one-way or two-way basis, the signals received from base, fixed, mobile, and portable stations, with no change in frequency or authorized bandwidth. A signal booster may be either narrowband (Class A), in which case the booster amplifies only those discrete frequencies intended to be retransmitted, or broadband (Class B), in which case all signals within the passband of the signal booster filter are amplified.

* * * * *

3. Section 94.95 is added to read as follows:

§ 94.95 Use of signal boosters.

Licensees authorized to operate multiple address systems in the 928-929/952-960 MHz and 932-932.5/941-941.5 MHz bands may employ signal boosters in accordance with the following criteria:

- (a) The amplified signal is retransmitted only on the exact frequency of the originating master or remote station. The booster will fill in only weak signal areas and cannot extend the system's signal coverage area.
- (b) The booster must be equipped with automatic gain control circuitry which will limit the total output of the booster to 500 milliwatts under all conditions. Boosters must meet the out-of-band emission limits of § 94.71.
- (c) Boosters will be installed with sufficient isolation between receiving and retransmitting circuits to prevent oscillation.
- (d) The licensee is given authority to use signal boosters without separate authorization from the Commission. Type-accepted equipment must be employed and the licensee must ensure that all applicable rule requirements are met.
- (e) Licensees employing Class B signal boosters as defined in § 94.3 are responsible for correcting any harmful interference that the signal booster may cause to other systems.